CHARGE NUMBER : 1801

PROJECT TITLE : Tobacco Processing

PERIOD COVERED: August 1-31, 1981

PROJECT LEADER: F. V. Utsch

I. REORDERING OF EXPANDED PRODUCTS

A. Reordering Cylinder Optimization (D. R. Fox)

The three-week MC reordering test grid has been completed. This test is the culmination of considerable effort in developing an understanding of the effects of reordering time, cylinder throughput, and cylinder loading on product CV and shred size.

Analysis and modelling of the test data are currently in progress. However, initial results are very encouraging in that the models appear to agree with the tentative conclusions reached from previous testing. The large decrease in product CV with increasing cylinder throughput was again observed. An increase in residence time in the cylinder improved CV's if the cylinder loading was held constant by reducing throughput. If throughput was held constant, the increase in residence time resulted in a reduction of product CV. These results indicate that residence time and cylinder loading are the two major variables affecting product filling power. Of the two, the loading effect is more significant than the residence time effect.

A report will be prepared after data analysis is completed. Preliminary conclusions are being transmitted to MC and Westab personnel.

B. Improved Reordering Methods (C. M. Wicks)

The technique of using humid air to add the final moisture to partially reordered DIET was investigated. DIET material was spray reordered to 5, 7, 9 and 11% OV and then exposed to humid air to bring the moisture to 11%. The data contains quite a bit of scatter; however, a general conclusion is that the average CCV loss using humid air after spraying is 4 CV units. The data scatter was too large to allow conclusions concerning the CV loss at the individual OV levels.

II. DIET CLUMP SEPARATION (R. Z. Burde, P. E. Aument)

A series of four replicate tests comparing the effectiveness of the experimental clumpbreaking units for separating large (100 pound) DIET clumps was completed.[1] The results showed that the squirrel cage unit and the inclined pinned conveyor were the most promising candidates, with only about a 3% reduction in the longs + mediums combined sieve fractions. Product breakage on the Rotex unit was substantial and the unit has been returned to the supplier. Evaluation of the inclined pinned conveyor in line with the Phase III impregnator is planned beginning in early October.

2022151439

III. CO_2 IMPREGNATION STUDIES (B. Donenfeld)

A. Presnowing and Gaseous Impregnation

Outside consultants in the cryogenic fields were consulted about the properties of dry ice snow. The CO_2 snow manufactured by the 4 cone snow head and fire extingiusher nozzles is coarse and agglomerates rapidly upon contact. Current approaches to obtaining a free-falling uniform snow include "granulation" of dry ice blocks and using CO_2 mists as produced in freezer tunnels.

B. Breakage During Impregnation

A vibrating conveyor in D Pilot Plant was fitted with an 8-mesh screen. A quantity of DBC bright blend was run over the screen to obtain a feedstock of 100% longs at 20% OV. Replicate batches of ambient degassed and insulated degassed liquid impregnated tobacco and thawed, freezer frozen tobacco are being submitted for sieves.

IV. EXPANSION TOWER DESIGN STUDIES (B. Donenfeld)

A. Particle Temperature Determination[2]

The test of the Hughes IR instrument on the 8" rectangular tower has been scheduled for September 9 & 10.

B. 3" Tower

A design request was submitted to Engineering Services to equip the 3-inch tower with an 800°F running capability. Replacement of the blower, cyclone separator and heater are planned.

V. FREEZE DRYING OF TOBACCO (B. Donenfeld)

An attempt was made to determine the freezing point of 20% OV DBC bright tobacco. The sample, contained in an insulated vessel, was frozen in a -100°F chest freezer. Three thermocouples provided an average tobacco bed temperature. A weight and LVDT cell were placed on the bed and a two-pen recorder traced the bed temperature and LVDT cell output. It had been hoped that as the tobacco thawed, the bed would become pliable and show an inflection in the LVDT output. Instead, a gradual settling took place as the temperature rose from -100° to +32°F. When removed, the tobacco was obviously thawed. Other avenues are being investigated for determining the freezing point range.

VI. WS REMOVAL (B. Donenfeld)[3]

Thermal treatment was evaluated as a means of removing WS-14 from filler. Both dry heat and steam were used. Each method was successful in removing over 90% of the WS. The dry heat required over 30 minutes at 300°F. Steam stripping was much more effective time-wise and the results indicated that steam distillation would be effective in WS recovery.

VII. DIELECTRIC DRYING OF RCB SHEET (R. Z. Burde, P. E. Aument)

Two rental units were installed in line-in the BL Pilot Plant. Tests are in progress and some 600 samples have been collected to date.[4] The product is being evaluated for the degree of drying and its dependence on the initial input moisture, the effect of drying on the chemical constitutents and moisture distribution throughout the sheet, and the physical characteristics of the sheet (CV, surface cracks, etc.).

Observation of the tests in progress lead to the following tentative conclusions, which need to be confirmed by complete evaluation of data:

1. The 12 1/2 KW units can only deliver up to 4 KW into the product. Thus the limiting factor is the ability of the product to accept the rapid surge of energy. This indicates that several low power units coupled together would be superior to one high power unit.

2. On the units tested, the maximum moisture reduction was from 30% to about 16% OV. Based on these findings, an additional unit is being rented to allow for a more complete drying study.

3. The effectiveness of the units is related to the initial RCB sheet moisture. This confirms the initial findings that dielectric treatment can improve moisture distribution in the sheet.

4. Excessive power input leads to arcing. Addition of a third unit and placement of a "hold-down" conveyor should greatly improve the situation.

VIII. OTHER EFFORTS

The large Triple S Dynamics air table testing showed only a 50% efficiency for removing buggy whips and an 83.4% product recovery at 250 lbs/hr. The testing was therefore discontinued. The salt ball removal effort also showed little promise. A summary and background of the pilot scale WET process development efforts was prepared and issued.[5,6]

IX. REFERENCES AND MEMO'S ISSUED

1. Memo to Mr. F. V. Utsch from P. E. Aument and R. Z. de la Burde "Evaluation of Clumpbreaking Methods", August 19, 1981.

2. Memo to K. S. Burns from B. Donenfeld, "Particle Temperature Determination", August 26, 1981.

3. Memo to K. S. Burns from B. Donenfeld, "Thermal Treatment for Removal of WS", August 27, 1981.

4. Development Notebook 7685 pages 1-65, P. E. Aument.

2022151441

5. Memo to K. S. Burns from P. E. Aument and R. Z. de la Burde, "Wet Process - Historical Perspective", June 29, 1981.

6. Letter to Mr. Robert M. Shaw of Fish and Neave regarding WET background and experimental results, from F. V. Utsch dated July 29, 1981.

7. Special Report, "Reduction of Residual Ammonia from Westab ET Using an Air Sweep", Accession No. 81-191 by P. E. Aument, August 13, 1981.

F. V. Utsch

/deb